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Abstract of Proposed Paper for  
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11-1 LE: Space Communications Technologies for Interstellar Missions

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This paper will examine candidate communications architectures for potential interstellar missions in an effort to determine feasibility for such links and to identify likely technology advances that will be needed to support such endeavors. Examination of this challenging and futuristic communications problem may serve to guide the direction and advancement of space telecommunications technologies useful for other nearer-term applications.

The paper will begin with a survey of proposed telecommunications architectures for previously studied interstellar mission designs. These include the Interstellar Precursor and Thousand Astronomical Unit (TAU) missions studied at the Jet Propulsion Laboratory in the 1970s and 1980s respectively, as well as the Daedalus Project studied by the British Interplanetary Society in the late 1970s. The feasibility of these architectures will be assessed against recent programmatic trends, such as mission cost reduction, and technological trends, such as flight system miniaturization. For a representative mission designed in the current era, performance of radio and optical frequency links will be assessed. Implications for the design of flight and ground telecommunications systems will be described. The capabilities and deficiencies of current technologies will be presented and the potential of foreseeable technology advances will be highlighted.